

A NEW SPECIES OF *MEGARIS* AND THE STATUS OF THE  
MEGARIDIDAE MCATEE & MALLOCH AND  
CANOPIDAE AMYOT & SERVILLE  
(HEMIPTERA: PENTATOMOIDEA)

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*Abstract.*—A new species of *Megarididae* is described. Descriptions are given of the male genitalia of *Megarididae stali*, *M. constricta*, *Canopus caesus*, *C. orbicularis* and *C. impressus*. The spermatheca and external female genitalia are described for *Megarididae laevicollis*, *M. atratula*, *Canopus burmeisteri*, *C. impressus*, *C. fabricii*, *C. caesus* and *C. orbicularis*. From a consideration of all available morphological evidence the family status of *Megarididae* and *Canopidae* is confirmed. Neither family is closely related to the *Plataspidae*.

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Very little work has been done on the interesting and unusual insects of the genera *Canopus* Fabricius and *Megarididae* Stål since McAtee and Malloch's revision in 1928. Barber (1939) added *Megarididae puertoricensis* and Kormilev (1956) described *Megarididae vianai*. Another species is added in this paper.

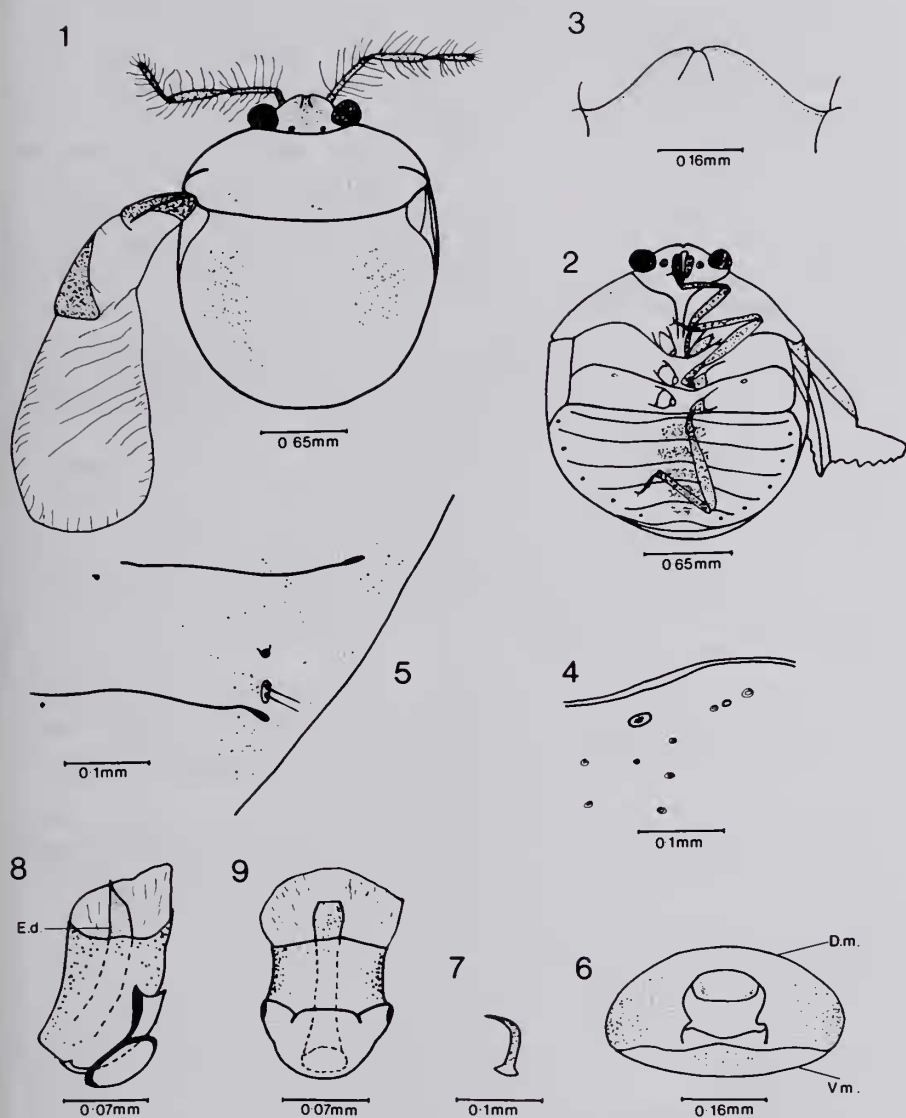
The general characteristics of these two genera have been very clearly set out in McAtee and Malloch's (1928) paper. I have attempted in this paper to examine these genera in more detail and come to some conclusion as to their correct status within the *Pentatomidae*. The two genera were put in separate subfamilies within the family *Pentatomidae* by McAtee and Malloch. However the *Pentatomidae* of these authors is equivalent to the *Pentatomidae* in most current classifications. Descriptions of the pygophore and external female genitalia are given to facilitate species recognition.

*Megarididae rotunda* n. sp.  
(Figs. 1-9)

Typical small oval *megaridid* (Fig. 1) with the scutellum completely covering the dorsal surface of the abdomen. Ventral surface flat (Fig. 2), dorsal surface steeply convex. Head tucked into the prothorax and protruding but little beyond it. Shiny rich reddish brown all over.

*Head.*—Head broader than long, eyes prominent, globular. Jugae (Fig. 3) short, converging, not completely meeting at apex of tylus. Antennae four segmented; all segments provided with very long fine setae; first segment short, second longest, third and fourth subequal.

Bucculae very short, indistinct. First rostral segment extending beyond bucculae by almost a half its length; rostrum not exceeding hind coxae.



Figs. 1-9. *Megaris rotunda* n. sp. 1. Dorsal view. 2. Ventral view. 3. Apex of head, dorsal view. 4. Stink gland aperture. 5. 5th abdominal sternite. 6. Pygophore. 7. Right clasper. 8. Aedeagus, lateral view. 9. Aedeagus, dorsal view. Dorsal margin (D.m.), endophallic duct (E.d.), ventral margin (V.m.).

*Thorax*.—Pronotum steeply declivous anteriorly, lateral angles with a rounded protuberance. Mesoscutellum covering abdomen entirely excepting corium where exposed by incision in anterolateral margins of mesoscutellum. Hemelytron (Fig. 1) heavily sclerotized along anterior half of margin, this portion terminating in large triangular red callus; remainder membranous, smoky brown. Membrane with a number of faint cross veins. Posterior wing membranous with a number of sclerotized veins. Hemelytron folded under scutellum; fold occurs at junction of callus and membrane.

Propleura raised anteriorly into collar, deeply grooved by sternum. Meso- and metapleura flat and plate-like. Metathoracic stink gland (Fig. 4) orifice minute, represented by an oval raised area; no evaporative area developed.

Coxae small, flattened, lying close to sterna; trochanters about same size as coxae, fused to the femora. Femora elongate, swollen medianly. Tibiae shorter than femora, uniform in diameter, provided with numerous fine short setae. Tarsi two segmented; first segment half the length of the second, latter bearing a pair of claws and pulvilli; both segments with a number of short fine setae.

*Abdomen*.—Sterna bowed cephalad medianly; sutures delimiting each segment terminating before reaching lateral margin. Spiracles near lateral margins of segments 2–7; trichobothria paired (Fig. 5), placed one behind other, very slightly laterad of spiracles.

*Male genitalia*.—(Figs. 6–9.) Pygophore opening facing caudad (Fig. 6), dorsal and ventral margin flattened into a broad rim surrounding the opening. Proctiger small, box-like. Claspers (Fig. 7) minute, L-shaped, apically acute.

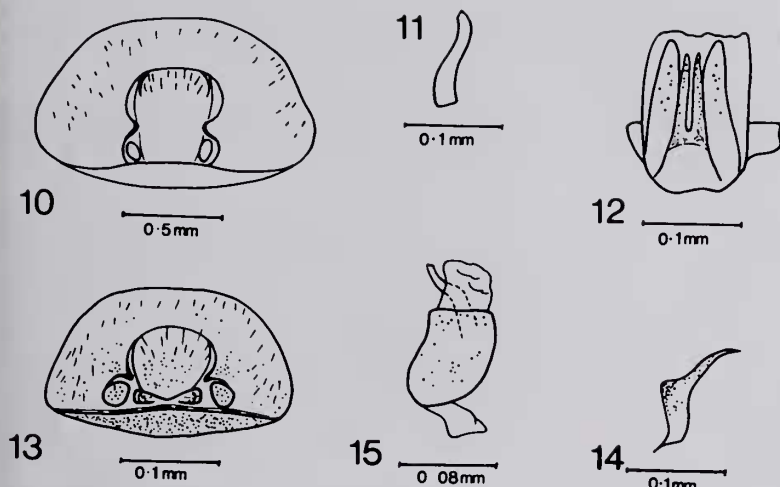
Aedeagus (Figs. 8, 9.) Basal plates large in relation to theca, latter squat, cylindrical, lightly sclerotized. Conjunctival appendages not apparent, membranous sheath surrounding apex of endophallic duct; latter short and tubular.

Female genitalia—not seen.

Diagnostic measurements:

Length	2.18 mm
Breadth	1.87 mm
Width between eyes	0.37 mm
Rostrum	1.15 mm
Antennal segment I	0.22 mm
II	0.50 mm
III	0.44 mm
IV	0.43 mm

*Type*.—Holotype, male, labeled: Brasilien, Nova Teutonia, 27°11'N 52°



Figs. 10–12. *Megarís stali*. 10. Pygophore. 11. Right clasper. 12. Aedeagus, dorsal view.

Figs. 13–15. *Megarís constricta*. 13. Pygophore. 14. Right clasper. 15. Aedeagus, lateral view.

23°L, 300,500 m. 11.1.1973. Fritz Plauman. (Deposited United States National Museum.)

### Description of the Genitalia of Some Species of *Megarís* and *Canopus*

#### *Male genitalia.*

*Megarís stali* McAtee and Malloch (Figs. 10–12). Pygophore (Fig. 10). Opening dorsal, surrounded by wide flattened area. Ventral border slightly sinuous with a vertical outer face forming caudal face of pygophore. Dorsal border bearing spine-like protuberances on each side above claspers; central border broadly arched, partially enclosing base of box-like proctiger. Claspers (Fig. 11), minute, conical, flattened, lying in rounded recess at each side beneath the ventral border.

Aedeagus (Fig. 12). Theca small, tubular, lightly sclerotized. One pair of strap-like conjunctival appendages. Ejaculatory duct straight, tubular, retracted wholly within theca when at rest, moderately sclerotized.

*Megarís constricta* McAtee and Malloch (Figs. 13–15). Pygophore (Fig. 13). Opening facing dorsad, surrounded by wide flange, mainly concealed beneath scutellum; ventral face vertical and heavily sclerotized. Dorsal margin deeply emarginate centrally, bearing small projections on each side.

Ventral margin straight. Proctiger tubular, lightly sclerotized, bearing a number of stout setae on dorsal surface. Claspers (Fig. 14) very small with a stout stem, apically tapering to a slender curved process.

Aedeagus (Fig. 15). Theca small cylindrical. One pair of membranous conjunctival appendages (not expanded). Endophallic duct small tubular and slightly sinuous, moderately sclerotized.

*Canopus caesus* (Germar) (Figs. 16–19). Pygophore (Fig. 16). Opening facing dorsad, ventral face of pygophore vertical. Ventral border straight; internally lying below the border is a thin arched shelf attached mesally and projecting caudad so that apex of arch is in line with ventral border. Dorsal border omega-shaped, merging lateroventrally with ventral border. Claspers (Fig. 17), lying on each side of ventral shelf, L-shaped; apical arm rod-like, bearing near apex on outer margin a long slender curved process. Medianly clasper expanded and flattened, bearing a number of long setae; basal stem narrow flattened.

Aedeagus (Figs. 18, 19). Theca small, squat, heavily sclerotized except for a band around apical margin and basally. One pair of strap-like membranous conjunctival appendages, basally with a small lobe. Median penial lobes fused, membranous except for outer margin which is heavily sclerotized, basally surrounding ejaculatory duct; latter thick, cylindrical, heavily sclerotized, bearing on dorsal surface a small elongate apically acute process.

*Canopus orbicularis* Horvath (Figs. 20–22). Pygophore (Fig. 20). Opening facing dorsad; ventral border straight; internally ventral wall of pygophore bearing an oblong plate attached midway at its base; plate projects freely upwards, bowed. Dorsal border omega shaped, surrounding base of proctiger centrally; latter box-like. Claspers (Fig. 21), L-shaped; apical arm flattened, blade-like, bearing near apex on outer margin a long thin curved process; mid portion of clasper expanded and somewhat flattened, bearing a number of long fine setae; stem of clasper cylindrical.

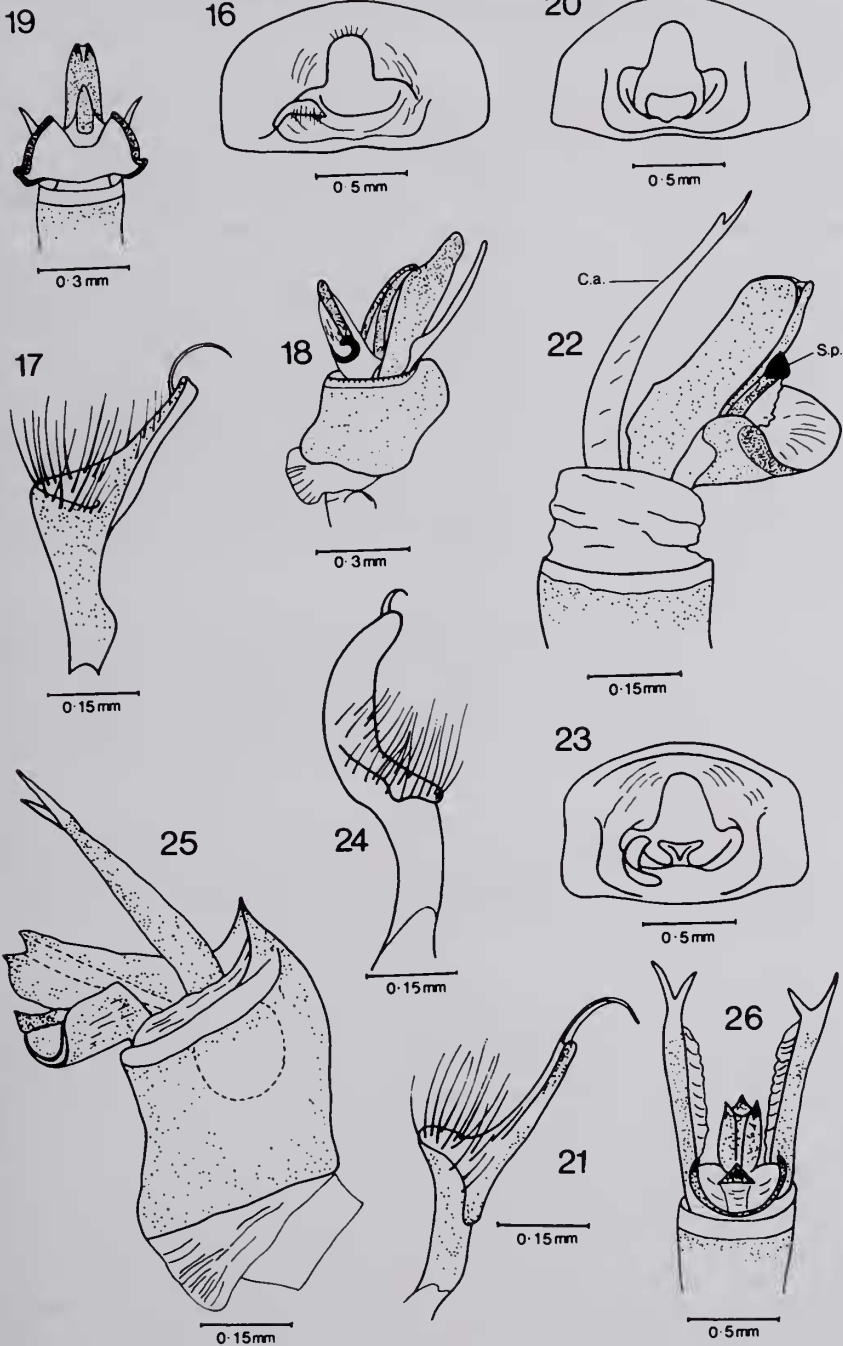
Aedeagus (Fig. 22). Theca squat, heavily sclerotized except for apical rim. One pair of membranous strap-like conjunctival appendages, apically bifid with two short rounded lobes. Median penial lobes fused into trough-like structure beneath vesica; ventral surface well sclerotized, dorsal surface

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Figs. 16–19. *Canopus caesus*. 16. Pygophore. 17. Right clasper. 18. Aedeagus, lateral view. 19. Aedeagus, ventral view.

Figs. 20–22. *Canopus orbicularis*. 20. Pygophore. 21. Right clasper, lateral view. 22. Aedeagus, lateral view.

Figs. 23–26. *Canopus impressus*. 23. Pygophore. 24. Right clasper, lateral view. 25. Aedeagus, lateral view. 26. Aedeagus, ventral view. Conjunctival appendage (C.a.), sclerotized process (S.p.).





membraneous. Endophallic duct large, tubular, heavily sclerotized, bearing on ventral surface a heavily sclerotized process, apically triangular, tapering basally.

*Canopus impressus* (Fabricius) (Figs. 23–26). Pygophore (Fig. 23). Ventral border straight, medianly somewhat thicker than in *C. orbicularis*, internally bearing a stalked oval plate-like projection somewhat similar to one found in *C. orbicularis*. Dorsal border with deep median V-shaped incision, laterally merging with ventral border; proctiger oblong, flattened, enclosed partially in median incision in dorsal border. Claspers (Fig. 24), shallow hook-shaped; anterior arm cylindrical apically, broadly rounded, bearing small curved process near apex on outer margin; clasper flattened medianly, bearing a number of long fine setae; stem cylindrical, tapering basally.

Aedeagus (Figs. 25, 26). Theca squat, cylindrical, bearing oblong shield-like extension on ventral margin; lateral and ventral apical margins unsclerotized. One pair of flattened blade-like conjunctival appendages sclerotized except for apices, latter bifid, produced into two short rounded arms. Median penial lobes fused into sclerotized trough-like structure lying below endophallic duct, latter large, tubular, sclerotized, bearing elongate process on ventral margin.

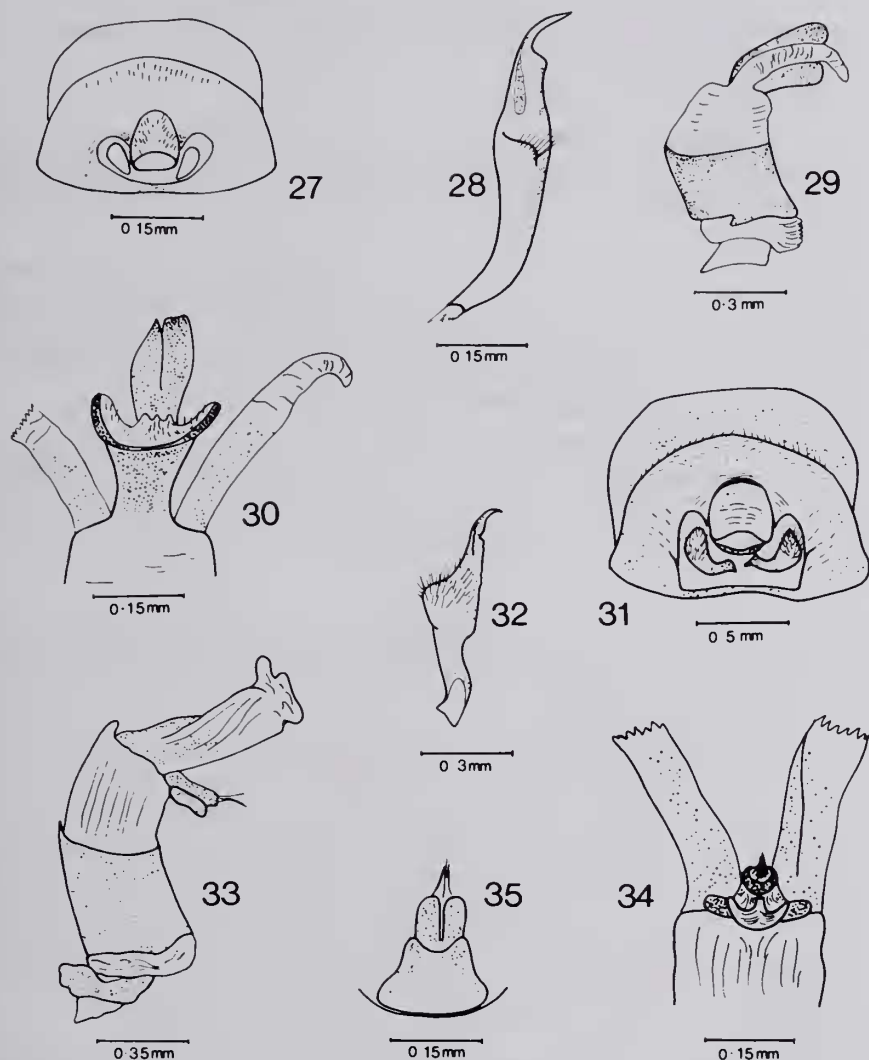
*Notes.*—These three species are very similar showing a distinct gradation in characters. The process on the clasper is smallest in *C. impressus* and longest in *C. caesus* and *C. orbicularis*. The plate lying beneath the ventral margin varies in shape in the three species being almost free in *C. impressus* and more elongate in *C. caesus*. The aedeagus also is very similar in the three species.

*Canopus burmeisteri* McAtee and Malloch (Figs. 27–30). Pygophore (Fig. 27). Opening surrounded by wide flat flange, dorsal border smoothly arched, ventral border straight. Proctiger small, tubular. Claspers (Fig. 28) elongate rod-like, apically tapering into a long thin curved process, a number of long setae found mid-laterally.

Aedeagus (Figs. 29, 30). Theca small, tubular, bearing large ring-like collar when expanded out, normally recessed within theca. One pair of elongate tubular conjunctival appendages, feebly sclerotized basally, apically membraneous. Median penial lobes fused into sclerotized trough-like structure lying beneath the endophallic duct; latter stout, oblong, heavily sclerotized.

*Canopus germari* McAtee and Malloch (Figs. 31–35). Pygophore (Fig. 31). Opening surrounded by wide flat flange, ventral margin straight, dorsal margin arched with two sharp V-shaped projections on either side of base of proctiger. Latter small, tubular. Claspers (Fig. 32) broad centrally, bearing a number of long setae, apically tapering and drawn into a fine hook; basally clasper with a tubular stem.

Aedeagus (Figs. 33–35). Theca small, squat, cylindrical, bearing mem-



Figs. 27–30. *Canopus burmeisteri*. 27. Pygophore. 28. Right clasper, lateral view. 29. Aedeagus, lateral view. 30. Aedeagus, ventral view.

Figs. 31–35. *Canopus germari*. 31. Pygophore. 32. Right clasper, lateral inner view. 33. Aedeagus, lateral view. 34. Aedeagus, ventro-apical view. 35. Median penial lobes.

braneous collar apically, invaginated within theca when at rest. One pair of flat oblong conjunctival appendages (probably tubular when fully expanded), apically membraneous, sclerotized towards base. Median penial lobes fused into a pyriform body (viewed ventrally), lying beneath the apex of the en-



dophallic duct; margins of lobes curved inwards forming a trough-like structure on the dorsal surface. Endophallic duct tubular, slightly sinuous, moderately sclerotized, apex diffuse, the whole structure lying in the trough formed by median penial lobes.

*Canopus fabricii* McAtee and Malloch (Figs. 36–38). Pygophore similar to *C. burmeisteri*, ventral margin slightly thickened. Claspers (Fig. 36), very similar to *C. burmeisteri*, with a large number of setae and somewhat stouter centrally.

Aedeagus (Figs. 37, 38). Theca squat, cylindrical, bearing apical sheath normally retracted within theca. One pair of conjunctival appendages, each bifid, one short arm and one longer tapering arm, longer arm membranous slightly sclerotized basally. Median penial lobes fused into a boat-like structure lying below the endophallic duct; latter stout, sinuous.

*Notes.* This species differs from *C. burmeisteri* in the following regards. Conjunctival appendages bifid, single in *burmeisteri*; median penial lobe smaller and differing in shape, *burmeisteri* more trough-like; ejaculatory duct slender, thicker and stouter in *burmeisteri*.

#### *Female genitalia.*

*Megarix laevicollis* Stål (Figs. 39, 40). Spermatheca (Fig. 39) simple globular structure surrounded by a larger membranous sac. No sclerites present around spermathecal opening.

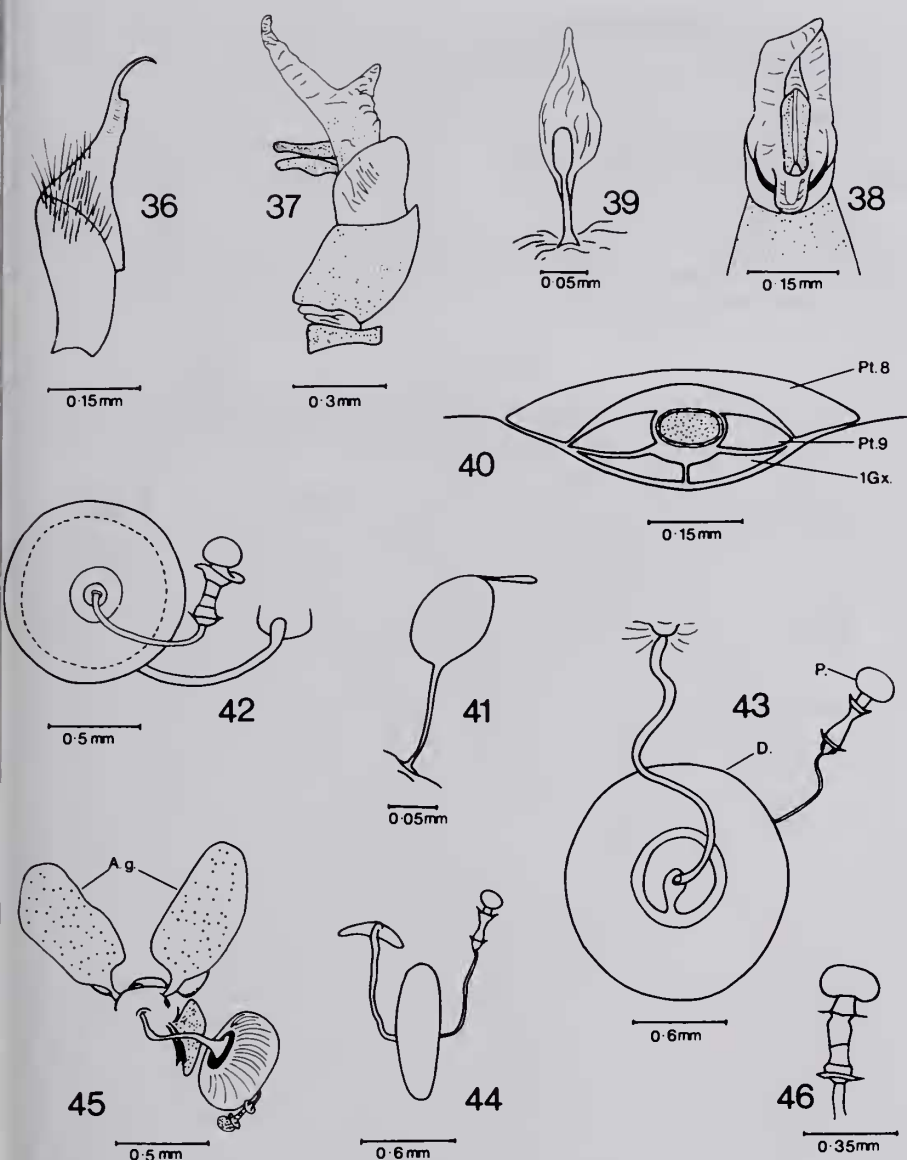
External genitalia (Fig. 40). Paratergites 8 fused centrally by narrow median band. Paratergites 9 lying one on either side of oval tenth segment, each paratergite concave centrally and fitting around tenth segment. First gonocoxae large, plate-like, mostly hidden under abdominal sterna; apical margins of each gonocoxa turned upwards forming all that is visible externally, which consists of a small oblong plate tapering to a fine point laterad.

*Megarix atratula* Stål (Fig. 41). Spermatheca a simple bulb with a small elongate appendix apically. No sclerites surrounding spermathecal opening.

External genitalia (Fig. 40) similar to *M. laevicollis*.

*Canopus burmeisteri* McAtee and Malloch (Fig. 42). Spermatheca (Fig. 41) consisting of well developed pump with proximal and distal flanges connected to sclerotized wheel-like spermathecal dilation. Duct from pump enters one side of spermathecal dilation centrally and a duct exits from other side centrally connecting spermatheca to vulva. Spermathecal dilation provided with a number of internal circular canals. Entrance of spermatheca into vulva without surrounding sclerites. Large paired sac-like accessory glands found ventrally, one on each side of spermathecal entrance. Vulva provided with paired interlocking sclerotized rami.

External genitalia described by McAtee and Malloch.



Figs. 36–38. *Canopus fabricii*. 36. Right clasper, inner view. 37. Aedeagus, lateral view. 38. Aedeagus, ventral view.

Figs. 39–40. *Megaritis laevicollis*. 39. Spermatheca. 40. Female genitalia.

Fig. 41. *Megaritis atratula*. Spermatheca.

Fig. 42. *Canopus burmeisteri*. Spermatheca.

Fig. 43. *Canopus impressus*. Spermatheca.

Fig. 44. *Canopus orbicularis*. Spermatheca.

Figs. 45–46. *Canopus fabricii*. 45. Spermatheca and accessory glands. 46. Spermathecal bulb. Accessory glands (A.g.), spermathecal dilation (D.), first gonocoxite (1 Gx), pump (P.), paratergite 8 (Pt. 8), paratergite 9 (Pt. 9).

*Canopus impressus* Fabricius (Figs. 43, 44). Similar to *C. burmeisteri*, interlocking rami and accessory glands present.

*Canopus fabricii* McAtee and Malloch (Figs. 45, 46). Similar to *C. burmeisteri*. Accessory glands (Fig. 45) large, covered with minute spines. Spermathecal dilation with internal striations. Interlocking rami present.

*Canopus orbicularis* Horvath. Similar to *C. burmeisteri*. Duct between spermathecal opening and dilation longer and more coiled than in *C. burmeisteri*. Interlocking rami and accessory glands present.

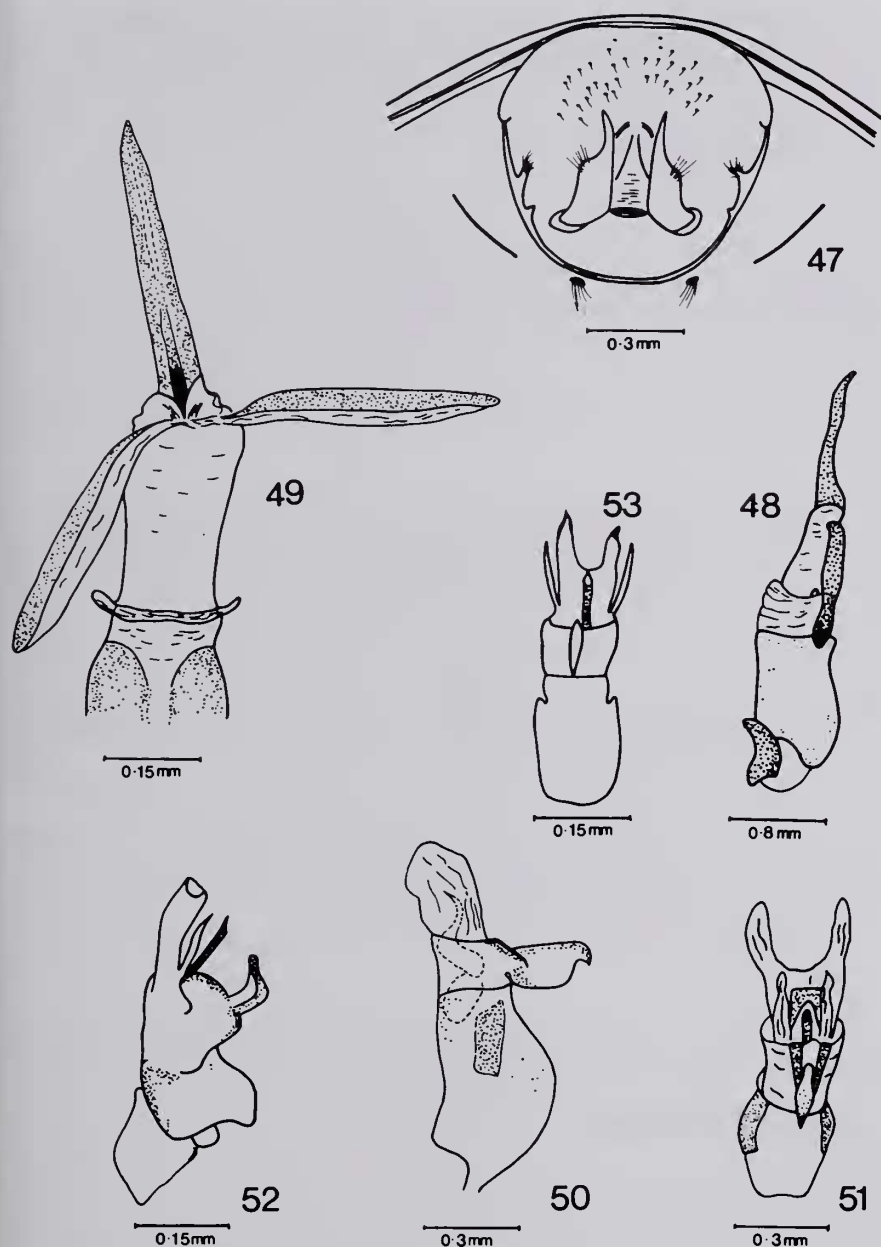
### Discussion

It is clear from an examination of the male and female genitalia and of other characters cited by McAtee and Malloch (1928) that the genera *Megaridius* and *Canopus* each warrant family status.

The Canopidae have a well developed series of parallel veins in the forewing whereas the Megarididae have no veins or only one major vein in the membrane. The male genitalia of the three megaridids examined are very simple, consisting of an unsclerotized conjunctiva surrounding a tube-like endophallic duct. The female spermatheca in two species examined is also simple and sac-like without a complicated pumping mechanism. The canopids examined all show much more highly evolved male and female genitalia. The male genitalia have well defined conjunctival appendages together with conjunctival processes associated with the endophallic duct. The females have a complex spermatheca with a well developed circular dilation or reservoir together with a well developed pumping mechanism. The vulva has paired interlocking rami on each side resembling those found in some species of Scutelleridae, and paired accessory glands were also found resembling some species of Cydnidae (McDonald, 1966).

Preliminary examination of the male and female genitalia of some species of Australian Plataspidae indicates that neither the canopids nor megaridids are closely related to this family (McAtee and Malloch, 1928). In the structure of the wing venation, however, the Canopidae do show some affinity with the Plataspidae in possessing parallel venation in the membrane. The spermatheca in the plataspids (McDonald, 1970) has a well developed pump but no dilation or reservoir in the duct. The males have a well developed aedeagus (Figs. 47-53) with conjunctival appendages, but these do not resemble the type of aedeagus found in either the Megarididae or Canopidae. The abdominal sutures in the nymphs (McAtee and Malloch, 1928) also distinguish these two families from the Plataspidae.

From the information so far obtained it would appear that the Megarididae, Canopidae and Plataspidae, while superficially resembling one another in possessing a well developed scutellum, are quite clearly separate families



Figs. 47-49. *Brachyplatys flavipes*. 47. Pygophore. 48. Aedeagus, lateral view. 49. Aedeagus, ventral view.

Figs. 50-51. *Coptosoma falloui*. 50. Vesica, lateral view. 51. Vesica, dorsal view.

Figs. 52-53. *Coptosoma hemispherica*. 52. Vesica, lateral view. 53. Vesica, dorsal view.

and are not closely related. The Megarididae are very primitive and are probably an early offshoot from the Pentatomoid line of evolution. The Canopidae are more highly evolved and show some affinity to the Scutelleridae. The Plataspidae have some affinity with the Pentatomidae but are not closely allied to them.

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